

ABSTRACT

A Preliminary Assessment/Site Investigation (PA/SI) at the propellant laboratory evaporation pond, Hill Air Force Base (Hill AFB), Utah was completed in conformance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and assessed the immediate or potential threat that past activities at the site pose to human health and the environment, and the need for further action. Soil and ground water samples were collected to determine if the evaporation pond or the surrounding area has been impacted by past activities or by the use of the evaporation pond.

The evaporation pond is located approximately 60 feet east of Building 1946 at the north end of Hill AFB. From 1962 until 1992, the evaporation pond was used to hold waste water from the propellant testing laboratory housed in Building 1946. Hill AFB personnel use the laboratory to test physical, chemical, and mechanical properties of propellant. The major component of the propellants tested was ammonium perchlorate. Other components of the various propellants tested over the years included polybutadiene, aluminum, stabilizer, nitrate/nitrites, ammonia, and chloride. In addition, approximately one liter of an unspecified solvent was used each day in process operations.

The subsurface consists of gravel and fine-grained sand with alternating sequences of silty to clayey sand. At approximately 75 feet the stratigraphy changes to a predominantly silty to clayey sand with alternating sequences of silty to sandy clay. The water bearing zone (i.e., saturated zone) was encountered at a depth of approximately 75 to 80 feet in all three borings. The apparent ground water flow direction is toward the northwest.

One or more of the explosives ammonium perchlorate, HMX and RDX were detected in three soil samples. Only ammonium perchlorate was detected below the surface, however. The relatively greater mobility of this compound is likely due to its higher solubility. These three explosives were present in the devices tested in the propellant laboratory and were likely transported with waste water discharged from Building 1946 to the evaporation pond. Action levels are determined on a case-by-case basis based on the potential risks to human health and the environment. To determine if further action is warranted, preliminary remediation goals

(PRGs) can be calculated for the site soil. The calculated risk-based value can then be compared to existing contaminant concentrations in the soil. If existing concentrations are found to be higher than the calculated PRGs, then a baseline risk assessment would be appropriate.

Di-n-butyl phthalate and bis (2-ethylhexyl) phthalate, common plasticizers, were detected in both surface and subsurface soil samples. The concentrations of these compounds in soil samples exceed levels generally expected from laboratory contamination or sampling procedures. Two additional samples were collected to confirm the presence of phthalates in the site surface soils. Bis(2-ethylhexyl) phthalate was detected in both confirmatory surface soil samples. Di-n-butyl phthalate was detected in one confirmatory sample. Diethyl phthalate, a plasticizer used in rocket propellants, was detected for the first time in both samples. There are no known sources for the other two phthalate compounds detected in the soil samples. However, because these compounds are designated hazardous substances, additional investigation is required to determine their sources or the risks to human health and the environment.

Metal concentrations in surface soil samples were generally higher than those detected in subsurface soil samples. Lead, cadmium, copper, zinc, and mercury concentrations in several surface soil samples were higher than the normal range for both Hill AFB and the Western United States. All remaining metals fell within either or both of the typical local and regional normal ranges for soils. With the exception of selenium and mercury, all metal concentrations detected in the subsurface soil samples fell within either or both of the normal ranges for soils. Because of these elevated levels, soil removed or disturbed should be tested by the Toxicity Characteristic Leaching Procedure (TCLP) to determine whether or not it is characterized as a hazardous waste.

Total petroleum hydrocarbons (TPH) were detected in surface soils collected from the evaporation pond. Based on the levels detected, further investigation of potential sources is not warranted. The pesticide 4,4'-DDE was present at the level of detection in a surface soil sample collected beneath the concrete sump.

Analysis of the ground water samples detected 1,1,1-trichloroethane, a potentially listed hazardous waste (F001, F002), in monitoring wells U6-11 and U6-12. Concentrations of 1,1,1-

trichloroethane did not exceed the Utah Primary Drinking Water Standard (R309-103-2), the Utah Ground Water Quality Standard (R317-6-2), or the federal maximum contaminant level (MCL) (40 CFR 141.61 Subpart A).

The metals analysis for the first sampling round indicated that beryllium, chromium, and nickel concentrations in down-gradient monitoring well U6-12 exceeded state and federal MCLs. The ground water sample collected from monitoring well U6-12 exceeded the Utah Ground Water Quality Standard for lead as well. The ground water sample collected from U6-13 exceeded the Utah Ground Water Quality Standards for chromium and lead concentrations. No metal concentrations exceeded state or federal MCLs for the second round of ground water sampling.

Possible sources of the constituents detected in the soil and ground water of the evaporation pond site include waste water discharged from Building 1946 to the evaporation pond which may have contained propellant cuttings and dust, water-displacing compounds, paint stripping solutions, oil leaked from machinery, and metal shavings from case cutting operations.